

ABSTRACT

An apparatus which is capable of supporting a process for gasifying a variety of hydrocarbon-containing materials. The resulting hydrogen-containing gas is suitable for use in various combustion processes and for petrochemical processes. A hydrocarbon-containing material is mixed with natural gas (or other suitable hydrocarbon gas) under pressure. The suspended material and gas are then injected under pressure into an acceleration/gasification tube. Intense heat (provided by an external energy source) is applied to the mixture as it travels through this tube, resulting in the cracking of the hydrocarbon chains and the release of additional energy. The released bond energy, along with the addition of the external energy, rapidly expands the gas and causes the velocity of the moving mixture to rise sharply as it proceeds down the tube. The acceleration/gasification tube is connected to a diffuser, which is essentially an expansion nozzle with a series of heat exchangers to cool the rapidly expanding gas. An evacuation pump is attached to the diffuser to extract the cooled gas and maintain flow in the system.